Chapter 9. Organizational Alliances, Partnerships, and Networks[1]

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Although the literature on organizational alliances and networks focuses primarily on private sector organizations, public sector organizations have long confronted pressures to manage their environments through the formation of alliances. Moreover, several organizational theorists have posited that private and public sector alliances are becoming more prevalent, particularly in the realm of research and development (Eisenhardt and Schoonhoven 1996; Freeman 1991; Hagedoorn 1995). Public/private science and technology partnerships can help focus new research initiatives toward addressing collective and public issues, such as health, national security, and environmental protection. These partnerships also promote public and private cost sharing to achieve science goals and objectives. Finally, science partnerships could encourage more efficient and effective science, reducing redundancies, eliminating excessive and/or unproductive competition, and encouraging synergy and cooperation where needed. In addition, public science policy will have to address when, where, and how to promote scientific partnerships with developing countries and/or other international or global scientific alliances/partnerships.

Theoretical Background

Over a half century ago, Coase (1937) suggested that firms and markets represent alternative means of organizing business transactions– an insight that was largely ignored until Williamson (1975; 1985) elaborated its significance almost four decades later. Williamson presented a conceptual framework that contrasted the market and the hierarchical firm as the two main transaction modes. He placed little emphasis on transaction modes that fell in between these two poles. This market/hierarchical firm dichotomy dominated subsequent organizational thinking. Williamson's core argument (1985:83) was that technical transactions will occur as *market exchanges* when they are straightforward, non-repetitive, and do not require transaction-specific investments; technical transactions will occur within hierarchically governed firms when they involve uncertainty about their outcome, recur frequently, and require substantial "transaction-specific investments" of money, time, or energy (meaning that they are not easily transferable). Williamson equated firms with hierarchies, assuming that all firms have hierarchical governance structures. Hierarchical firms basically come into existence because (1) it is difficult to specify clear contractual rights, obligations, and performance expectations for uncertain, repetitive, and asset-specific transactions; and (2) these types of transactions require strict monitoring and control to prevent the opportunism that could arise in the absence of strong hierarchical authority relations. Even though there are inefficiencies associated with hierarchical, bureaucratic organizations, organizations prefer these disadvantages to the relatively greater costs and risks that would occur if the transactions were conducted as market exchanges.

More recent scholars have challenged this market/hierarchy dichotomy. These challenges have been leveled on two fronts. First, the historical accuracy of the characterization has been attacked. Some argue that markets, in the modern sense of the term, did not exist until the latter

[1] Related chapters include: Science Policy; Strategy; Change Management; Knowledge Management; Teams, Projects, and Programs; Organizational Communication.

part of the eighteenth century. Early markets, such as those in medieval England, were steeped in personal, hierarchical, and symbolic underpinnings. Even after the rise of the modern market, craft-based firms in northern Italy and industries in southwestern Germany continued to be characterized by diversified, inter-firm linkages of suppliers, assemblers, and end users (Brusco 1982; Finley 1973; Herrigel 1990; Sabel 1989), and Japanese business groups even now continue to rely on extensive and flexible partnerships that promote joint learning and shared responsibility for technological innovation (Aoki 1990; Dore 1987; Fruin 1992; Sako 1992). The history of economic activity, whether told by Braudel (1982), Polanyi (1957), Thompson (1971), or Wallerstein (1974), is thus a story of enterprises characterized by loose and highly permeable boundaries, in contrast to firm/market dichotomies (Powell 1990).

Second, and most importantly, there is growing recognition that contemporary firms are increasingly blurring their boundaries by engaging in forms of collaboration that resemble neither the familiar "arm's length" contracting arrangement of market exchanges nor the ideal hierarchical integration of the firm (Powell 1990). They are moving beyond hierarchical command and control governance structures and developing organizational contexts and support structures to facilitate internal and external exchanges and on-going relationships. The upsurge in non-hierarchical organizational forms challenges not only the accuracy of the market/hierarchy dichotomy, but also the power of this characterization as an explanatory device. Rather than treating non-hierarchical organizational forms as hybrids (Williamson 1991), theorists now see them as distinct organizational types that require a new explanatory frameworks. Several labels have been used to describe these organizational forms, such as *virtual* (Chesbrough and Teece 1996; Davidow and Malone 1992), *network* (Powell 1990), or *flexible specialization* (Piore and Sabel 1984). Whatever the label, these emerging organizations are attempting to govern economic exchanges in ways not captured by the market-hierarchy dichotomy.

Current Trends in Organizational Alliances and Inter-Firm Networks

For several decades, organizations have been placing greater priority on managing the external environment by building stronger relationships with customers and suppliers. These relationships can, but do not always reach the level of organizational partnerships. Recently, organizations have moved beyond customer/supplier relationships to begin to establish alliances with their competitors (Mariotti 1996). These inter-firm alliances typically take the form of formal organizational partnerships. Competitor alliances initially focused on specific joint product development efforts, but they are increasingly undertaking longer-term basic research and development (R&D) collaborations.

The expansion of organizational "partnerings" and other forms of external collaborations are especially pronounced in R&D intensive sectors, such as in the computer, semi-conductor, and biotech industries (Eisenhardt and Schoonhoven 1996; Freeman 1991; Hagedoorn 1995). As far back as the 1960s, computer firms said that IBM was not their competition but their environment (Porter 1985:7). IBM and GM were early leaders in forging organizational alliances that dramatically transformed their organizational boundaries. These companies now stand at the center of "vast, complicated, multinational confederations linking them to scores of other organizations" (Porter 1985:6). Alliance formation is now rampant throughout R&D-intensive industries, with the biotech industry taking the lead. Powell et al. (1996) found that network density within the biotech industry has increased dramatically in the last decade.

Causes of Organizational Alliances/Partnerships

Factors that have promoted organizational alliances and partnerships can be divided into two categories: motivators and facilitators.

Motivating Factors

Pressures to Access Know-How and Promote New Knowledge and Learning

The need to form knowledge alliances is the most frequently cited cause of the rise in network organizations and inter-firm alliances (Powell 1998; Badaracco 1991). It is increasingly difficult for any single firm or organization to develop internally all the capabilities needed to foster new innovations. Obtaining the necessary knowledge via the market may not be feasible because the requisite knowledge can often only be developed in conjunction with those possessing specific understanding of the desired application. Further, in the formative stages of knowledge creation, knowledge tends to be tacit (meaning in-depth and highly inter-connected) as well as dense (meaning tightly packed and full of relationships). The market is not a good transfer mechanism for tacit and/or dense knowledge (Liebeskind et al. 1996). Thus, as the required knowledge base of an industry expands and becomes more complex, and the sources of expertise become more widely dispersed, the locus of innovation is increasingly found in networks of organizational alliances rather than in individual firms (Powell et al. 1996). To succeed in this environment, organizations must not only develop their absorptive capacity, i.e., their ability to identify, process, and utilize existing knowledge (see *Chapter 13: Innovation*), but also their ability to develop and manage collaborations to create and apply new knowledge (Powell et al. 1996).

Coping with Greater Competition, Crowding, and Speed

An increasing number of private sector companies, as well as nonprofit research institutes, universities, and government laboratories around the world, are engaged in R&D. Hundreds of small science-based entrepreneurial companies have been created in the United States and abroad (Powell et al. 1996). Greater R&D competition has substantially shortened the product life cycle and contributed to a corresponding need to increase the speed of innovation and new product development. Since rewards often go to the swiftest, competition today can best be regarded as a knowledge or learning race. The competitive context creates a significant incentive for organizations to collaborate because collaborations can increase the speed of innovation (Deeds and Hill 1996). In addition, research confirms that the speed of innovation and new product development tends to be faster within non-hierarchical entrepreneurial management structures (see *Chapter 4: Innovation*). To compete in this environment, established firms often attempt to develop internal pockets or centers for entrepreneurship. They also seek to stay competitive by spinning off new startups or partnering with other organizations to create new entrepreneurial startups.

Other forms of competition, those that do not necessarily require knowledge partnerships to enhance the speed of innovation, can also motivate organizational alliances or, at least, strong inter-firm relationships. Uzzi (1996) found that the degree of social embeddedness of apparel firms in New York affected the firm's survival rate. Stuart (1998) found that organizations in crowded industries experienced greater pressure, as well as greater opportunity, to form alliances. In addition, once collaborations become more prevalent in an organizational field, the pressure to

collaborate becomes greater for all organizations within that field and it becomes more difficult for organizations to survive as independent, isolated entities.

Obtaining Complementary Competencies

Small entrepreneurial firms, while conducive to innovation and new product development, often are not equipped to manage other requirements of business success. To enhance their competitiveness and survival, these small entrepreneurial companies frequently partner with venture capitalist firms as well as investors of all kinds. Increasingly, they are partnering with established corporations to gain business expertise and resources. For example, the hurdles experienced by new biotech companies in obtaining intellectual property rights from the Patent and Trade Office and product approval from the U.S. Food and Drug Administration have motivated them to form partnerships with large pharmaceutical corporations that have the experience to effectively manage these relationships (Powell et al. 1996).

Managing Uncertainty/Risk

Several decades ago, the resource dependency approach to organizational theory and research posited that firms facing uncertain environments would establish joint ventures as a means of reducing uncertainty and sharing the risk (Pfeffer and Novak 1976). Similarly, when sources of knowledge are diverse and the pathway of technological development is uncharted, alliances are expected to be most frequent (Powell et al. 1996). Early, as opposed to later, phases of R&D are most amenable to organizational alliances because uncertainty is higher and appropriation less of a threat at early stages of development (Leibeskind et al. 1996). Conversely, as research pursuits become more mature, firms may attempt to internalize all the essential expertise as a strategy to protect against misappropriation (Levin et al. 1987).

Improving Flexibility and Complex Adaptation

When exchanges occur through social networks, the costs of contracting are reduced or eliminated, exit barriers are more easily avoided, and firms can more readily develop alliances with different partners as needed (Leibeskind et al. 1996). In addition, Uzzi (1997) found that embeddedness in organizational networks promotes adaptation because firms are less subject to short-term pressures and shocks. Organizations use their organizational networks to pool resources, pursue longer-term strategies, help out exchange partners when needed, and inform one another of work shortages and fluctuations. Social networks provide an important resource for firms and alliances and partnerships can provide a strategic advantage.

Facilitating Factors

Organizational Position and Reputation

Stuart (1998) notes that many of the motivating factors identified in the literature do not really explain whether and when collaborations will occur or among which organizations. He suggests that industry crowding and organizational reputation are important factors determining a firm's opportunity to form collaborations. However, as Powell et al. (1996) and Stuart and Podolny (1999) note, an organization's reputation is in some sense a product of its alliances. In general, the greater the number of alliances, the better the firm's reputation. Stuart and Podolny (1999)

also found that the "technical distance" that marks these alliances affects the firm's position and reputation. Alliances with technically distant competitors extend a firm's knowledge base into new and unrelated areas, which enhances the firm's reputational position in technical or ideational space. However, at some point the returns derived from alliance formation decrease (Powell et al. 1999; Uzzi 1996).

Trust

Alliances, as opposed to market-based contracts, require a high level of trust. Leibeskind et al. (1996) suggest that some degree of trust is present among R&D firms because of pre-existing social networks, shared scientific training, and the existence of well-established standards and methods guiding the conduct of science. They further suggest that strong social networks and shared norms can provide more protection against appropriation than markets do, especially where contracts may not be adequate to prevent misappropriation. In addition, knowledge that contributes to the discovery process may not be patentable, and patenting newly discovered knowledge may be too slow to prevent appropriation with respect to follow-on products (Levin et al. 1987).

Communication Technologies and the Internet

It is obvious that communication and information technologies, such as the internet and E-commerce capabilities, have helped supplier/customer networks and inter-firm alliances reach new levels. Partners can now take advantage of instantaneous communication systems and data sharing technologies to facilitate the working relationships among alliance partners.

Government and Regulatory Context

The United States government has been taking a stronger position in supporting public/private sector R&D ventures, with the use of cooperative research and development agreements (CRADAS) and other mechanisms. More informally, governmental agencies have increasingly played a role in bringing together organizations with shared interests to exchange information on public good issues. In addition, changes in the regulatory environment have greatly facilitated the ability of U.S. firms to engage in cooperative activities with market competitors. For example, the National Cooperative Research Act allowed coordinated research and development activities among firms to an extent not previously possible (Podolny and Page 1998).

The Application of this Topic to Public Science Management

This literature indicates that the ability to build and maintain alliances, partnerships, and networks is increasingly essential to competitiveness in the R&D world. It also indicates that private/public R&D alliances are being pursued with greater frequency. Finally, it indicates that government policy and practice can promote or hinder the formation of the types of alliances that are needed for R&D. These research findings and the theoretical projections deriving from this literature suggest several issues of relevance to public science management, for example:

- What alliances and partnerships should be promoted and/or facilitated by public science directing and funding organizations? To what extent should they foster partnerships and alliances

- Among themselves?
- Among public science executing organizations?
- With private sector R&D organizations in this country?
- With R&D organizations in developing countries?
- Of a global nature?

- What should the partnership/alliance strategy be for public science executing organizations?

Organizational alliances and partnerships are seen by many in the science and research community as increasingly necessary to ensure the success of their organizations. Promoting alliances, partnerships, and networks could also promote greater effectiveness and efficiency in the science system as a whole. This issue needs greater attention, both in terms of public science policies, as well as methods of effective implementation. There are many implementation issues that need to be addressed, such as dealing with data and information security, the legalities of partnerships, the incentives required and the protections needed, etc. R&D partnerships are, as yet, fairly uncharted territory. The government has created CRADAs and has initiated some large R&D collaborations, such as the Manhattan and the Genome projects, but there is still much to learn in this area. Once government policy is determined, public science organizations could play an instrumental role in implementing the policy and resolving critical issues, such as creating a culture of cooperation, facilitating knowledge management technologies, and addressing information security issues.

A clear role for the government is to encourage, support, and collaborate in R&D pursuits that promote desired social goals and/or alleviate social problems. What is not clear is how to determine which alliances will most enhance the possibility of success and the extent to which encouraging and supporting alliances should become a more important consideration of government R&D support. It is also important to determine the extent to which the government should actively support R&D to enhance our country's economic competitiveness. As R&D is becoming ever more essential to a country's economic standing, and with other governments actively supporting private sector R&D, determining the proper role of the U.S. government in supporting and collaborating in R&D that primarily benefits private sector businesses. Should government support be primarily directed at R&D that is in its infancy and highly dependent on private/public sector and possibly inter-firm alliances to help provide both the financial and knowledge resources necessary for success? How should priorities be established? Although this literature cannot directly provide answers to these questions, the future R&D policy and strategy of the government can and should be informed, to some extent, by this literature. In addition, the strategy of public science directing and funding organizations and public science executing organizations need to take these issues into account if they want to increase the effectiveness and efficiency of science.

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